WHAT IS CLAIMED IS:

1. An apparatus, comprising:

a work area;

an uncaging light source that directs uncaging light at the work area or a selected portion thereof; and,

an optical meter that monitors the uncaging light, the optical meter being positioned in a first plane that runs through the work area.

2. The apparatus of claim **1**, wherein the optical meter comprises an optical power density meter, an optical power meter, an optical energy density meter, or an optical energy meter.

3. The apparatus of claim **1**, wherein optical power density of the uncaging light is substantially uniform over the entire work area.

4. The apparatus of claim **3**, wherein optical power density of the uncaging light has a uniformity less than about ±15%, less than about ±10%, less than about ±5%, less than about ±3%, or less than about ±1.5% over the entire work area.

5. The apparatus of claim **1**, wherein the uncaging light has a wavelength between about 300 nm and about 700 nm or between about 300 nm and about 400 nm.

6. The apparatus of claim **5**, wherein the uncaging light has a wavelength distribution centered at 365 nm.

7. The apparatus of claim **1**, wherein the uncaging light has a wavelength selected by a user of the apparatus.

8. The apparatus of claim **1**, wherein the uncaging light is collimated.

9. The apparatus of claim **1**, wherein the uncaging light is not collimated.

10. The apparatus of claim **1**, wherein optical power density of the uncaging light is greater than about 1 mW/cm^2 or about 5 mW/cm^2 and less than about 50,000 mW/cm^2, about 20,000 mW/cm^2, or about 10,000 mW/cm^2.

11. The apparatus of claim **1**, wherein the area of the work area or the selected portion thereof is greater than 25 μm^2, greater than 0.01 mm^2, greater than 1 mm^2, greater than 100 mm^2, greater than 10 cm^2, greater than 100 cm^2, or greater than 500 cm^2.

12. The apparatus of claim **1**, wherein the area of the work area or the selected portion thereof is less than 3 cm^2, less than 100 mm^2, less than 10 mm^2, less than 1.5 mm^2, less than 0.1 mm^2, less than 0.25 mm^2, less than 2500 μm^2, or less than 50 μm^2.

13. The apparatus of claim **1**, wherein at least one reaction region occupies the work area.

14. The apparatus of claim **13**, wherein the first plane runs through the reaction region.

15. The apparatus of claim **13**, wherein the reaction region comprises a well of a multiwell plate, a sample tube, a channel of a microfluidic chip, a capillary, a spot on a two-dimensional array, or a spot on a three-dimensional array.

16. The apparatus of claim **13**, wherein the reaction region comprises a photoactivatable caged component, and wherein exposure to the uncaging light results in uncaging of the caged component.

17. The apparatus of claim **16**, wherein the photoactivatable caged component is a photolabile caged component.

18. The apparatus of claim **1**, wherein the apparatus further comprises a multiwell plate and a plate holder configured to accept the multiwell plate in a first fixed position, wherein the multiwell plate in the first fixed position occupies the work area.

19. The apparatus of claim **18**, wherein the multiwell plate has a top surface and a bottom surface, and wherein the first plane is parallel to the top and bottom surfaces of the multiwell plate.

20. The apparatus of claim **18**, wherein the uncaging light impinges on a bottom surface of the multiwell plate.

21. The apparatus of claim **18**, wherein the uncaging light impinges on a top surface of the multiwell plate.

22. The apparatus of claim **18**, further comprising a plate handling element that moves the multiwell plate at least from the first fixed position to a second fixed position.

23. The apparatus of claim **18**, wherein the plate holder is configured to accept a mask, the mask altering optical power density of the uncaging light impinging on at least a first portion of the multiwell plate.

24. The apparatus of claim **23**, wherein the mask prevents the uncaging light from impinging on at least the first portion of the multiwell plate and permits the uncaging light to impinge on at least a second portion of the multiwell plate.

25. The apparatus of claim **1**, wherein the apparatus further comprises a mask, the mask altering optical power density of the uncaging light impinging on at least a first portion of the work area.

26. The apparatus of claim **25**, wherein the mask prevents the uncaging light from impinging on at least the first portion of the work area and permits the uncaging light to impinge on at least a second portion of the work area.

27. The apparatus of claim **1**, wherein the apparatus further comprises an exposure controller that controls optical energy density of the uncaging light to which the work area or the selected portion thereof is exposed.

28. The apparatus of claim **27**, wherein the exposure controller controls the optical energy density of the uncaging light by controlling optical power density of the uncaging light and/or an exposure time, which exposure time is an amount of time to which the work area or the selected portion thereof is exposed to the uncaging light.

29. The apparatus of claim **28**, wherein the exposure controller accepts an input from a user of the apparatus, which input indicates a desired exposure time.

30. The apparatus of claim **28**, wherein the exposure controller accepts an input from a user of the apparatus, which input indicates a desired optical energy density.

31. The apparatus of claim **30**, wherein the exposure controller accepts a signal from the optical meter.

32. The apparatus of claim **31**, wherein the exposure controller uses the signal from the optical meter to adjust the exposure time to achieve the desired optical energy density.

33. The apparatus of claim **30**, wherein an actual optical energy density to which the work area or the selected portion thereof is exposed is substantially equal to the desired optical energy density.

34. The apparatus of claim **33**, wherein the actual optical energy density varies from the desired optical energy density by less than 10%, less than 5%, or less than 3%.

35. The apparatus of claim **1**, wherein the apparatus further comprises a safety shield, which safety shield reduces exposure of a user of the apparatus to the uncaging light.

36. The apparatus of claim **1**, wherein at least one reaction region comprising a labeled component occupies the work area, further comprising a detector that detects a signal from the labeled component.

37. The apparatus of claim **36**, further comprising a data storage system that stores signal intensity measured by the detector, the data storage system being coupled to the detector.

38. The apparatus of claim **36**, further comprising a computer that controls operation of the apparatus and records signal intensity measured by the detector.

39. The apparatus of claim **1**, further comprising a heating element configured to maintain the work area at a selected temperature.

40. The apparatus of claim **1**, wherein at least one reaction region occupies the work area, further comprising a fluid-handling element operably connected to the reaction region.

41. The apparatus of claim **1**, wherein at least one reaction region occupies the work area, further comprising a translator that translates the reaction region relative to the uncaging light source and/or a translator that translates the uncaging light source relative to the reaction region.

42. An apparatus, comprising:

a work area;

an uncaging light source that directs uncaging light at the work area or a selected portion thereof, wherein the uncaging light has an optical power density greater than 100 $\mu W/cm^2$ at one or more wavelengths between about 100 nm and about 400 nm;

a multiwell plate; and,

a plate holder configured to accept the multiwell plate in a first fixed position, wherein the multiwell plate in the first fixed position occupies the work area, wherein the multiwell plate comprises a photoactivatable caged component, and wherein exposure to the uncaging light results in uncaging of the caged component.

43. The apparatus of claim **42**, wherein the photoactivatable caged component is a photolabile caged component.

44. The apparatus of claim **42**, wherein optical power density of the uncaging light is substantially uniform over the entire work area.

45. The apparatus of claim **44**, wherein optical power density of the uncaging light has a uniformity less than about ±15%, less than about ±10%, less than about ±5%, less than about ±3%, or less than about ±1.5% over the entire work area.

46. The apparatus of claim **42**, wherein the optical power density of the uncaging light is greater than about 300 $\mu W/cm^2$, greater than about 500 $\mu W/cm^2$, greater than about 700 $\mu W/cm^2$, or greater than about 900 $\mu W/cm^2$ at one or more wavelengths between about 100 nm and about 400 nm.

47. The apparatus of claim **42**, wherein optical power density of the uncaging light is greater than about 1 mW/cm^2 or about 5 mW/cm^2 and less than about 50,000 mW/cm^2, about 20,000 mW/cm^2, or about 10,000 mW/cm^2.

48. The apparatus of claim **42**, wherein the uncaging light has a wavelength between about 300 nm and about 700 nm or between about 300 nm and about 400 nm.

49. The apparatus of claim **48**, wherein the uncaging light has a wavelength distribution centered at 365 nm.

50. The apparatus of claim **42**, wherein the uncaging light has a wavelength selected by a user of the apparatus.

51. The apparatus of claim **42**, wherein the uncaging light is collimated.

52. The apparatus of claim **42**, wherein the uncaging light is not collimated.

53. The apparatus of claim **42**, further comprising an optical meter that monitors the uncaging light.

54. The apparatus of claim **53**, wherein the optical meter comprises an optical power density meter, an optical power meter, an optical energy density meter, or an optical energy meter.

55. The apparatus of claim **42**, wherein the area of the work area or the selected portion thereof is greater than 25 μm^2, greater than 0.01 mm^2, greater than 1 mm^2, greater than 100 mm^2, greater than 10 cm^2, greater than 100 cm^2, or greater than 500 cm^2.

56. The apparatus of claim **42**, wherein the area of the work area or the selected portion thereof is less than 3 cm^2, less than 100 mm^2, less than 10 mm^2, less than 1.5 mm^2, less than 0.1 mm^2, less than 0.25 mm^2, less than 2500 μm^2, or less than 50 μm^2.

57. The apparatus of claim **42**, wherein the uncaging light impinges on a bottom surface of the multiwell plate.

58. The apparatus of claim **42**, wherein the uncaging light impinges on a top surface of the multiwell plate.

59. The apparatus of claim **42**, further comprising a plate handling element that moves the multiwell plate at least from the first fixed position to a second fixed position.

60. The apparatus of claim **42**, wherein the plate holder is configured to accept a mask, the mask altering optical power density of the uncaging light impinging on at least a first portion of the multiwell plate.

61. The apparatus of claim **60**, wherein the mask prevents the uncaging light from impinging on at least the first portion of the multiwell plate and permits the uncaging light to impinge on at least a second portion of the multiwell plate.

62. The apparatus of claim **42**, wherein the apparatus further comprises an exposure controller that controls optical energy density of the uncaging light to which the work area or the selected portion thereof is exposed.

63. The apparatus of claim **62**, wherein the exposure controller controls the optical energy density of the uncaging light by controlling optical power density of the uncaging light and/or an exposure time, which exposure time is an amount of time to which the work area or the selected portion thereof is exposed to the uncaging light.

64. The apparatus of claim **63**, wherein the exposure controller accepts an input from a user of the apparatus, which input indicates a desired exposure time.

65. The apparatus of claim **63**, wherein the exposure controller accepts an input from a user of the apparatus, which input indicates a desired optical energy density.

66. The apparatus of claim **65**, further comprising an optical meter, wherein the exposure controller accepts a signal from the optical meter.

67. The apparatus of claim **66**, wherein the exposure controller uses the signal from the optical meter to adjust the exposure time to achieve the desired optical energy density.

68. The apparatus of claim **65**, wherein an actual optical energy density to which the work area or the selected portion thereof is exposed is substantially equal to the desired optical energy density.

69. The apparatus of claim **68**, wherein the actual optical energy density varies from the desired optical energy density by less than 10%, less than 5%, or less than 3%.

70. The apparatus of claim **42**, wherein the apparatus further comprises a safety shield, which safety shield reduces exposure of a user of the apparatus to the uncaging light.

71. The apparatus of claim **42**, wherein the multiwell plate comprises a labeled component, further comprising a detector that detects a signal from the labeled component.

72. The apparatus of claim **71**, further comprising a data storage system that stores signal intensity measured by the detector, the data storage system being coupled to the detector.

73. The apparatus of claim **71**, further comprising a computer that controls operation of the apparatus and records signal intensity measured by the detector.

74. The apparatus of claim **42**, further comprising a heating element configured to maintain the work area at a selected temperature.

75. The apparatus of claim **42**, further comprising a fluid-handling element operably connected to the multiwell plate.

76. The apparatus of claim **42**, further comprising a translator that translates the multiwell plate relative to the uncaging light source and/or a translator that translates the uncaging light source relative to the multiwell plate.

77. An apparatus, comprising:

a work area;

an uncaging light source that directs uncaging light at the work area or a selected portion thereof, wherein optical power density of the uncaging light is substantially uniform over the entire work area; and,

an exposure controller that controls optical energy density of the uncaging light to which the work area or the selected portion thereof is exposed, whereby the work area is exposed to a desired optical energy density selected by a user of the device.

78. The apparatus of claim **77**, wherein the optical power density of the uncaging light has a uniformity less than about ±15%, less than about ±10%, less than about ±5%, less than about ±3%, or less than about ±1.5% over the entire work area.

79. The apparatus of claim **77**, wherein the uncaging light has a wavelength between about 300 nm and about 700 nm or between about 300 nm and about 400 nm.

80. The apparatus of claim **79**, wherein the uncaging light has a wavelength distribution centered at 365 nm.

81. The apparatus of claim **77**, wherein the uncaging light has a wavelength selected by a user of the apparatus.

82. The apparatus of claim **77**, wherein the uncaging light is collimated.

83. The apparatus of claim **77**, wherein the uncaging light is not collimated.

84. The apparatus of claim **77**, wherein the optical power density of the uncaging light is greater than about 1 mW/cm^2 or about 5 mW/cm^2 and less than about 50,000 mW/cm^2, about 20,000 mW/cm^2, or about 10,000 mW/cm^2.

85. The apparatus of claim **77**, wherein the area of the work area or the selected portion thereof is greater than 25 μm^2, greater than 0.01 mm^2, greater than 1 mm^2, greater than 100 mm^2, greater than 10 cm^2, greater than 100 cm^2, or greater than 500 cm^2.

86. The apparatus of claim **77**, wherein the area of the work area or the selected portion thereof is less than 3 cm^2, less than 100 mm^2, less than 10 mm^2, less than 1.5 mm^2, less than 0.1 mm^2, less than 0.25 mm^2, less than 2500 μm^2, or less than 50 μm^2.

87. The apparatus of claim **77**, wherein the exposure controller controls the optical energy density of the uncaging light by controlling the optical power density of the uncaging light and/or an exposure time, which exposure time is an amount of time to which the work area or the selected portion thereof is exposed to the uncaging light.

88. The apparatus of claim **87**, further comprising an optical meter that monitors the uncaging light, wherein the exposure controller accepts a signal from the optical meter.

89. The apparatus of claim **88**, wherein the optical meter comprises an optical power density meter, an optical power meter, an optical energy density meter, or an optical energy meter.

90. The apparatus of claim **88**, wherein the exposure controller uses the signal from the optical meter to adjust the exposure time to achieve the desired optical energy density.

91. The apparatus of claim **77**, wherein an actual optical energy density to which the work area or the selected portion thereof is exposed is substantially equal to the desired optical energy density.

92. The apparatus of claim **91**, wherein the actual optical energy density varies from the desired optical energy density by less than 10%, less than 5%, or less than 3%.

93. The apparatus of claim **77**, further comprising an optical meter that monitors the uncaging light.

94. The apparatus of claim **93**, wherein the optical meter is positioned in a first plane that runs through the work area.

95. The apparatus of claim **93**, wherein the optical meter comprises an optical power density meter, an optical power meter, an optical energy density meter, or an optical energy meter.

96. The apparatus of claim **77**, wherein at least one reaction region occupies the work area.

97. The apparatus of claim **96**, wherein the reaction region comprises a well of a multiwell plate, a sample tube, a channel of a microfluidic chip, a capillary, a spot on a two-dimensional array, or a spot on a three-dimensional array.

98. The apparatus of claim **96**, wherein the reaction region comprises a photoactivatable caged component, and wherein exposure to the uncaging light results in uncaging of the caged component.

99. The apparatus of claim **98**, wherein the photoactivatable caged component is a photolabile caged component.

100. The apparatus of claim **77**, wherein the apparatus further comprises a multiwell plate and a plate holder configured to accept the multiwell plate in a first fixed position, wherein the multiwell plate in the first fixed position occupies the work area.

101. The apparatus of claim **100**, wherein the uncaging light impinges on a bottom surface of the multiwell plate.

102. The apparatus of claim **100**, wherein the uncaging light impinges on a top surface of the multiwell plate.

103. The apparatus of claim **100**, further comprising a plate handling element that moves the multiwell plate at least from the first fixed position to a second fixed position.

104. The apparatus of claim **100**, wherein the plate holder is configured to accept a mask, the mask altering optical power density of the uncaging light impinging on at least a first portion of the multiwell plate.

105. The apparatus of claim **104**, wherein the mask prevents the uncaging light from impinging on at least the first portion of the multiwell plate and permits the uncaging light to impinge on at least a second portion of the multiwell plate.

106. The apparatus of claim **77**, wherein the apparatus further comprises a mask, the mask altering optical power density of the uncaging light impinging on at least a first portion of the work area.

107. The apparatus of claim **106**, wherein the mask prevents the uncaging light from impinging on at least the first portion of the work area and permits the uncaging light to impinge on at least a second portion of the work area.

108. The apparatus of claim **77**, wherein the apparatus further comprises a safety shield, which safety shield reduces exposure of a user of the apparatus to the uncaging light.

109. The apparatus of claim **77**, wherein at least one reaction region comprising a labeled component occupies the work area, further comprising a detector that detects a signal from the labeled component.

110. The apparatus of claim **109**, further comprising a data storage system that stores signal intensity measured by the detector, the data storage system being coupled to the detector.

111. The apparatus of claim **109**, further comprising a computer that controls operation of the apparatus and records signal intensity measured by the detector.

112. The apparatus of claim **77**, further comprising a heating element configured to maintain the work area at a selected temperature.

113. The apparatus of claim **77**, wherein at least one reaction region occupies the work area, further comprising a fluid-handling element operably connected to the reaction region.

114. The apparatus of claim **77**, wherein at least one reaction region occupies the work area, further comprising a translator that translates the reaction region relative to the

uncaging light source and/or a translator that translates the uncaging light source relative to the reaction region.

115. A masked multiwell plate, comprising:

a multiwell plate; and,

a mask, which mask alters optical power density of uncaging light impinging on at least a first portion of the multiwell plate.

116. The masked multiwell plate of claim **115**, wherein the mask prevents the uncaging light from impinging on at least the first portion of the multiwell plate and permits the uncaging light to impinge on at least a second portion of the multiwell plate.

117. The masked multiwell plate of claim **115**, wherein the mask is disposed on a bottom surface of the multiwell plate.

118. The masked multiwell plate of claim **115**, wherein the first portion of the multiwell plate comprises a portion of at least one well of the multiwell plate.

119. The masked multiwell plate of claim **115**, wherein the first portion of the multiwell plate comprises one or more entire wells of the multiwell plate.

120. The masked multiwell plate of claim **115**, wherein the multiwell plate comprises a photoactivatable caged component, and wherein exposure to the uncaging light results in uncaging of the caged component.

121. The masked multiwell plate of claim **120**, wherein the photoactivatable caged component is a photolabile caged component.

122. A method of initiating an assay within a reaction area, the method comprising:

introducing at least one photoactivatable caged component of the assay into the reaction area, wherein the reaction area has an area of at least about 50 mm^2; and,

exposing the reaction area to uncaging light, the optical power density of the uncaging light being substantially uniform over the entire reaction area, whereby exposure to the uncaging light results in uncaging of the caged component.

123. The method of claim **122**, wherein the optical power density of the uncaging light has a uniformity less than about ±15%, less than about ±10%, less than about ±5%, less than about ±3%, or less than about ±1.5% over the entire reaction area.

124. The method of claim **122**, wherein exposing the reaction area to uncaging light comprises exposing the reaction area to a desired optical energy density of the uncaging light.

125. The method of claim **124**, wherein an actual optical energy density to which the reaction area is exposed is substantially equal to the desired optical energy density.

126. The method of claim **125**, wherein the actual optical energy density varies from the desired optical energy density by less than 10%, less than 5%, or less than 3%.

127. The method of claim **122**, wherein the uncaging light is collimated.

128. The method of claim **122**, wherein the uncaging light is not collimated.

129. The method of claim **122**, wherein the optical power density of the uncaging light is greater than about 1 mW/cm^2 or about 5 mW/cm^2 and less than about 50,000 mW/cm^2, about 20,000 mW/cm^2, or about 10,000 mW/cm^2.

130. The method of claim **122**, wherein the uncaging light has a wavelength between about 300 nm and about 700 nm or between about 300 nm and about 400 nm.

131. The method of claim **130**, wherein the uncaging light has a wavelength distribution centered at 365 nm.

132. The method of claim **122**, wherein the reaction area comprises one or more wells of a multiwell plate, sample tubes, channels of a microfluidic chip, capillaries, spots on a two-dimensional array, or spots on a three-dimensional array.

133. The method of claim **122**, wherein the area of the reaction area is greater than 75 mm^2, greater than 100 mm^2, greater than 10 cm^2, greater than 100 cm^2, or greater than 500 cm^2.

134. The method of claim **122**, wherein the photoactivatable caged component is a photolabile caged component.

135. The method of claim **122**, wherein the caged component comprises one or more of: a caged polypeptide, a caged nucleic acid, a caged small molecule, a caged nucleoside triphosphate, a caged chelating agent, or a caged metal ion.

136. The method of claim **122**, wherein the caged component comprises a caged sensor, a caged nucleic acid probe, a caged modulator, a caged interfering RNA, a caged antisense nucleic acid, a caged ribozyme, a caged biomolecular analog, a caged transcription factor, a caged molecular decoy, a caged antibody, or a caged aptamer.

137. The method of claim **122**, wherein the reaction area comprises a labeled component, further comprising detecting a signal from the labeled component.